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SEQUENCE LISTING

<110> Wild et al.

<120> Methods of Eliciting Broadly Neutralizing Antibodies
Targeting HIV-1 gp41

<130> 1589.0160001

<140>

<141>

<160> 84

<170> PatentIn Ver. 2.1

<210> 1

<211> 55

<212> PRT

<213> Human immunodeficiency virus type 1

<400> 1

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu
1 5 10 15

Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
20 25 30

Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
35 40 45

Asp Gln Gln Leu Leu Gly Ile
50 55

<210> 2

<211> 38

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 2

Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu
20 25 30

Arg Tyr Leu Lys Asp Gln
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<210> 3

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 3

Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Ile Leu
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<210> 4

<211> 56

<212> PRT

<213> Human immunodeficiency virus

<400> 4

Trp Asn Asn Met Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr
1 5 10 15

Thr Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu
20 25 30

Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp
35 40 45

Asn Trp Phe Asn Ile Thr Asn Trp
50 55

<210> 5

<211> 36

<212> PRT

<213> Human immunodeficiency virus type 1

<400> 5

Tyr Thr Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln
1 5 10 15

Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu
20 25 30

Trp Asn Trp Phe
35

<210> 6

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 6

Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His
1 5 10 15

Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
20 25 30

Leu Leu

<210> 7
<211> 5
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 7
ggggs

5

<210> 8
<211> 345
<212> PRT
<213> Human immunodeficiency virus type 1

<400> 8
Ala Val Gly Ile Gly Ala Leu Phe Leu Gly Phe Leu Gly Ala Ala Gly
1 5 10 15
Ser Thr Met Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln
20 25 30
Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile
35 40 45
Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln
50 55 60
Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln
65 70 75 80
Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala
85 90 95
Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp
100 105 110
Asn Asn Met Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr
115 120 125
Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys
130 135 140
Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn
145 150 155 160
Trp Phe Asn Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met
165 170 175
Ile Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Ala Val Leu Ser
180 185 190

Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr
195 200 205

His Leu Pro Thr Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu
210 215 220

Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Ile Arg Leu Val Asn Gly
225 230 235 240

Ser Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser
245 250 255

Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu
260 265 270

Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp Asn Leu
275 280 285

Leu Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu
290 295 300

Asn Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu
305 310 315 320

Val Val Gln Gly Ala Cys Arg Ala Ile Arg His Ile Pro Arg Arg Ile
325 330 335

Arg Gln Gly Leu Glu Arg Ile Leu Leu
340 345

<210> 9
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 9
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40 45

<210> 10
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 10
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala

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1 5 10 15
Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu Ala Leu Glu Arg Tyr Leu Arg Asp Gln
35 40 45

<210> 11
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 11
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu
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<210> 12
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 12
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu
20 25 30
Arg Tyr Leu Arg Asp Gln
35

<210> 13
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 13
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln Arg Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln

20 25 30
Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Gly Asp Gln
35 40 45

<210> 14
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 14
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln Arg Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu
35

<210> 15
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 15
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln Arg Met Leu Gln Leu
1 5 10 15

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
20 25 30

Arg Tyr Leu Gly Asp Gln
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<210> 16
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 16
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu Ala Leu Glu Arg Tyr Leu Arg Asp Gln

35

40

45

<210> 17
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 17
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu
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<210> 18
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 18
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu
20 25 30
Arg Tyr Leu Arg Asp Gln
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<210> 19
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 19
Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu Ala Ile Glu Arg Tyr Leu Arg Asp Gln
35 40 45

<210> 20
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 20
Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu
35

<210> 21
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 21
Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu
20 25 30
Arg Tyr Leu Arg Asp Gln
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<210> 22
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 22
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu Ala Val Glu Ser Tyr Leu Lys Asp Gln
35 40 45

<210> 23
<211> 38
<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 23

Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
20 25 30

Ser Tyr Leu Lys Asp Gln
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<210> 24

<211> 45

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 24

Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Gln Asp Gln
35 40 45

<210> 25

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 25

Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu
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<210> 26

<211> 38

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 26

Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
20 25 30
Arg Tyr Leu Gln Asp Gln
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<210> 27

<211> 45

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 27

Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Val Leu Ala Leu Glu Arg Tyr Leu Arg Asp Gln
35 40 45

<210> 28

<211> 38

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 28

Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu
20 25 30
Arg Tyr Leu Arg Asp Gln
35

<210> 29

<211> 45

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 29

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Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Gln Ala
1 5 10 15

Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Val Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40 45

<210> 30
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 30
Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Gln Ala
1 5 10 15

Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Val Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu
35

<210> 31
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 31
Ser Asn Leu Leu Arg Ala Ile Gln Ala Gln Gln His Met Leu Gln Leu
1 5 10 15

Thr Val Trp Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
20 25 30

Arg Tyr Leu Lys Asp Gln
35

<210> 32
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 32
Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40 45

<210> 33
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 33
Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Arg Val Leu
35

<210> 34
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 34
Ser Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln His Leu Leu Lys Leu
1 5 10 15

Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu
20 25 30

Arg Tyr Leu Lys Asp Gln
35

<210> 35
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 35
Ser Gly Ile Val Gln Gln Gln Asn Ile Leu Leu Arg Ala Ile Glu Ala
1 5 10 15

Gln Gln His Leu Leu Gln Leu Ser Ile Trp Gly Ile Lys Gln Leu Gln
20 25 30

Ala Lys Val Leu Ala Ile Glu Arg Tyr Leu Arg Asp Gln
 35 40 45

<210> 36
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 36
 Ser Gly Ile Val Gln Gln Gln Asn Ile Leu Leu Arg Ala Ile Glu Ala
 1 5 10 15
 Gln Gln His Leu Leu Gln Leu Ser Ile Trp Gly Ile Lys Gln Leu Gln
 20 25 30
 Ala Lys Val Leu
 35

<210> 37
 <211> 38
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 37
 Asn Ile Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
 1 5 10 15
 Ser Ile Trp Gly Ile Lys Gln Leu Gln Ala Lys Val Leu Ala Ile Glu
 20 25 30
 Arg Tyr Leu Arg Asp Gln
 35

<210> 38
 <211> 45
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 38
 Lys Gly Ile Val Gln Gln Gln Asp Asn Leu Leu Arg Ala Ile Gln Ala
 1 5 10 15
 Gln Gln Gln Leu Leu Arg Leu Ser Xaa Trp Gly Ile Arg Gln Leu Arg
 20 25 30
 Ala Arg Leu Leu Ala Leu Glu Thr Leu Leu Gln Asn Gln
 35 40 45

<210> 39
<211> 35
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 39
Lys Gly Ile Val Gln Gln Gln Asp Asn Leu Leu Arg Ala Ile Gln Ala
1 5 10 15
Gln Gln Gln Leu Leu Arg Leu Ser Xaa Trp Gly Ile Arg Gln Leu Arg
20 25 30
Ala Arg Leu
35

<210> 40
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 40
Asp Asn Leu Leu Arg Ala Ile Gln Ala Gln Gln Gln Leu Leu Arg Leu
1 5 10 15
Ser Xaa Trp Gly Ile Arg Gln Leu Arg Ala Arg Leu Leu Ala Leu Glu
20 25 30
Thr Leu Leu Gln Asn Gln
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<210> 41
<211> 46
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 41
Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His
1 5 10 15
Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
20 25 30
Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
35 40 45

<210> 42
<211> 46
<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 42

Trp Met Glu Trp Glu Arg Glu Ile Glu Asn Tyr Thr Gly Leu Ile Tyr
1 5 10 15

Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp
20 25 30

Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
35 40 45

<210> 43

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 43

Trp Met Glu Trp Glu Arg Glu Ile Glu Asn Tyr Thr Gly Leu Ile Tyr
1 5 10 15

Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp
20 25 30

Leu Leu

<210> 44

<211> 36

<212> PRT

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<220>

<223> Description of Artificial Sequence:Synthetic

<400> 44

Tyr Thr Gly Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln
1 5 10 15

Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu
20 25 30

Trp Asn Trp Phe
35

<210> 45

<211> 46

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 45

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Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Ser Glu Ile Tyr
 1              5              10              15

Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
              20              25              30

Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
      35              40              45

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<210> 46

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 46

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Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Ser Glu Ile Tyr
 1              5              10              15

Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
      20              25              30

Leu Leu

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<210> 47

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 47

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Tyr Thr Ser Glu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln
 1              5              10              15

Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu
      20              25              30

Trp Asn Trp Phe
      35

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<210> 48

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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 48

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Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Asp Tyr Ile Tyr
1 5 10 15
Asp Leu Leu Glu Lys Ser Gln Thr Gln Gln Glu Lys Asn Glu Lys Glu
20 25 30
Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
35 40 45

<210> 49
<211> 34
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 49
Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Asp Tyr Ile Tyr
1 5 10 15
Asp Leu Leu Glu Lys Ser Gln Thr Gln Gln Glu Lys Asn Glu Lys Glu
20 25 30

Leu Leu

<210> 50
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 50
Tyr Thr Asp Tyr Ile Tyr Asp Leu Leu Glu Lys Ser Gln Thr Gln Gln
1 5 10 15
Glu Lys Asn Glu Lys Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu
20 25 30

Trp Asn Trp Phe
35

<210> 51
<211> 46
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 51
Trp Ile Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Gly Ile Ile Tyr
1 5 10 15

Arg Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Asn Asn Glu Lys Asp
20 25 30

Leu Leu Ala Leu Asp Lys Trp Gln Asn Leu Trp Ser Trp Phe
35 40 45

<210> 52

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<213> Artificial Sequence

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<223> Description of Artificial Sequence:Synthetic

<400> 52

Trp Ile Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Gly Ile Ile Tyr
1 5 10 15

Arg Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Asn Asn Glu Lys Asp
20 25 30

Leu Leu

<210> 53

<211> 36

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<223> Description of Artificial Sequence:Synthetic

<400> 53

Tyr Thr Gly Ile Ile Tyr Arg Leu Leu Glu Glu Ser Gln Asn Gln Gln
1 5 10 15

Glu Asn Asn Glu Lys Asp Leu Leu Ala Leu Asp Lys Trp Gln Asn Leu
20 25 30

Trp Ser Trp Phe
35

<210> 54

<211> 46

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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 54

Trp Met Glu Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gly Leu Ile Tyr
1 5 10 15

Asp Leu Ile Glu Glu Ser Gln Ile Gln Gln Glu Lys Asn Glu Lys Asp
20 25 30

Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
 35 40 45

<210> 55
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 <223> Description of Artificial Sequence:Synthetic

<400> 55
 Trp Met Glu Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gly Leu Ile Tyr
 1 5 10 15
 Asp Leu Ile Glu Glu Ser Gln Ile Gln Gln Glu Lys Asn Glu Lys Asp
 20 25 30

Leu Leu

<210> 56
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 <223> Description of Artificial Sequence:Synthetic

<400> 56
 Tyr Thr Gly Leu Ile Tyr Asp Leu Ile Glu Glu Ser Gln Ile Gln Gln
 1 5 10 15
 Glu Lys Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu
 20 25 30

Trp Asn Trp Phe
 35

<210> 57
 <211> 46
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 57
 Trp Met Glu Trp Gln Lys Glu Ile Ser Asn Tyr Ser Asn Glu Val Tyr
 1 5 10 15
 Arg Leu Ile Glu Lys Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Gly
 20 25 30

Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
 35 40 45

<210> 58
<211> 34
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 58
Trp Met Glu Trp Gln Lys Glu Ile Ser Asn Tyr Ser Asn Glu Val Tyr
1 5 10 15
Arg Leu Ile Glu Lys Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Gly
20 25 30
Leu Leu

<210> 59
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 59
Tyr Ser Asn Glu Val Tyr Arg Leu Ile Glu Lys Ser Gln Asn Gln Gln
1 5 10 15
Glu Lys Asn Glu Gln Gly Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu
20 25 30
Trp Asn Trp Phe
35

<210> 60
<211> 46
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 60
Trp Ile Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr
1 5 10 15
Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp
20 25 30
Leu Leu Ala Leu Asp Asn Trp Ala Ser Leu Trp Thr Trp Phe
35 40 45

<210> 61
<211> 34
<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 61

Trp Ile Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr
1 5 10 15

Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp
20 25 30

Leu Leu

<210> 62

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 62

Tyr Thr Gln Gln Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln
1 5 10 15

Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Asn Trp Ala Ser Leu
20 25 30

Trp Thr Trp Phe
35

<210> 63

<211> 46

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 63

Trp Met Glu Trp Asp Arg Gln Ile Asp Asn Tyr Thr Glu Val Ile Tyr
1 5 10 15

Arg Leu Leu Glu Leu Ser Gln Thr Gln Gln Glu Gln Asn Glu Gln Asp
20 25 30

Leu Leu Ala Leu Asp Lys Trp Asp Ser Leu Trp Asn Trp Phe
35 40 45

<210> 64

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 64

Trp Met Glu Trp Asp Arg Gln Ile Asp Asn Tyr Thr Glu Val Ile Tyr
1 5 10 15

Arg Leu Leu Glu Leu Ser Gln Thr Gln Gln Glu Gln Asn Glu Gln Asp
20 25 30

Leu Leu

<210> 65

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 65

Tyr Thr Glu Val Ile Tyr Arg Leu Leu Glu Leu Ser Gln Thr Gln Gln
1 5 10 15

Glu Gln Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Asp Ser Leu
20 25 30

Trp Asn Trp Phe
35

<210> 66

<211> 47

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 66

Trp Ile Gln Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gly Ile Ile Tyr
1 5 10 15

Ser Leu Ile Glu Glu Ala Gln Asn Gln Gln Glu Asn Asn Glu Lys Asp
20 25 30

Leu Leu Ala Leu Asp Lys Trp Thr Asn Leu Trp Asn Trp Phe Asn
35 40 45

<210> 67

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 67

-23-

Trp Ile Gln Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gly Ile Ile Tyr
1 5 10 15

Ser Leu Ile Glu Ala Gln Asn Gln Gln Glu Asn Asn Glu Lys Asp
20 25 30

Leu Leu

<210> 68

<211> 37

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 68

Tyr Thr Gly Ile Ile Tyr Ser Leu Ile Glu Glu Ala Gln Asn Gln Gln
1 5 10 15

Glu Asn Asn Glu Lys Asp Leu Leu Ala Leu Asp Lys Trp Thr Asn Leu
20 25 30

Trp Asn Trp Phe Asn
35

<210> 69

<211> 46

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 69

Trp Gln Gln Trp Asp Glu Lys Val Arg Asn Tyr Ser Gly Val Ile Phe
1 5 10 15

Gly Leu Ile Glu Gln Ala Gln Glu Gln Gln Asn Thr Asn Glu Lys Ser
20 25 30

Leu Leu Glu Leu Asp Gln Trp Asp Ser Leu Trp Ser Trp Phe
35 40 45

<210> 70

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic

<400> 70

Trp Gln Gln Trp Asp Glu Lys Val Arg Asn Tyr Ser Gly Val Ile Phe
1 5 10 15

Gly Leu Ile Glu Gln Ala Gln Glu Gln Gln Asn Thr Asn Glu Lys Ser
20 25 30

Leu Leu

<210> 71
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 71
Tyr Ser Gly Val Ile Phe Gly Leu Ile Glu Gln Ala Gln Glu Gln Gln
1 5 10 15

Asn Thr Asn Glu Lys Ser Leu Leu Glu Leu Asp Gln Trp Asp Ser Leu
20 25 30

Trp Ser Trp Phe
35

<210> 72
<211> 46
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 72
Trp Gln Glu Trp Asp Arg Gln Ile Ser Asn Ile Ser Ser Thr Ile Tyr
1 5 10 15

Glu Glu Ile Gln Lys Ala Gln Val Gln Gln Glu Gln Asn Glu Lys Lys
20 25 30

Leu Leu Glu Leu Asp Glu Trp Ala Ser Ile Trp Asn Trp Leu
35 40 45

<210> 73
<211> 34
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 73
Trp Gln Glu Trp Asp Arg Gln Ile Ser Asn Ile Ser Ser Thr Ile Tyr
1 5 10 15

Glu Glu Ile Gln Lys Ala Gln Val Gln Gln Glu Gln Asn Glu Lys Lys
20 25 30

Leu Leu

<210> 74
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 74
Ile Ser Ser Thr Ile Tyr Glu Glu Ile Gln Lys Ala Gln Val Gln Gln
1 5 10 15
Glu Gln Asn Glu Lys Lys Leu Leu Glu Leu Asp Glu Trp Ala Ser Ile
20 25 30
Trp Asn Trp Leu
35

<210> 75
<211> 465
<212> DNA
<213> Artificial Sequence

<220>
<221> CDS
<222> (34)..(357)

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 75
agcggtagcgc cgaaagtacg cgctaagctt cat atg ggt att gtt cag cag cag 54
Met Gly Ile Val Gln Gln Gln
1 5

aac aat ttg ctg agg gct att gag gcg caa cag cac ctg ctg cag ctg 102
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
10 15 20

acc gta tgg ggc atc aag cag ctg cag gca cgc atc ctg gct gtt gaa 150
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu
25 30 35

cgc tac ctg aag gat caa ggc ggc ggc tca ggc gcc ggc tca gag tgg 198
Arg Tyr Leu Lys Asp Gln Gly Gly Gly Ser Gly Ala Gly Ser Glu Trp
40 45 50 55

gac aga gaa att aac aat tac aca agc tta ata cac tcc tta att gaa 246
Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His Ser Leu Ile Glu
60 65 70

gaa tcg caa aac cag caa gaa aag aat gaa caa gaa tta ttg gaa tta 294
Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu
75 80 85

gat aaa tgg gca agt ttg tgg aat tgg ttt gaa ttc atc gat gat atc 342
 Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Glu Phe Ile Asp Asp Ile
 90 95 100

aga tcc ggc tgc taa caaagcccga aaggaagctg agtttggtg ctgccacccg 397
 Arg Ser Gly Cys
 105

ctgagcaata actagcataa ccccttgggg gcctctaaac gggctcttgag ggggtttttg 457
 cttgaaag 465

<210> 76
 <211> 107
 <212> PRT
 <213> Artificial Sequence
 <223> Description of Artificial Sequence:Synthetic

<400> 76
 Met Gly Ile Val Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
 1 5 10 15
 Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
 20 25 30
 Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gly Gly Gly
 35 40 45
 Ser Gly Ala Gly Ser Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser
 50 55 60
 Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
 65 70 75 80
 Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
 85 90 95
 Phe Glu Phe Ile Asp Asp Ile Arg Ser Gly Cys
 100 105

<210> 77
 <211> 197
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 77
 gagggactat atccggttat tcacaaggac ggctgtgggc gccatgatcg cgtagtcgat 60
 agtggctcca agtaaccgga agcgacaggg actgtgccgg gcgccaaagg cggtcgacag 120
 tgctttctag aaccgggtgc gcataaaaat gcatcacgcc tatagcgcta gagccgctgc 180
 attaaatgaa tcggcca 197

<210> 78
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 78
Tyr Thr Ser Leu Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln
1 5 10 15

Glu Lys

<210> 79
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 79
Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu
1 5 10 15

Leu Asp

<210> 80
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 80
Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
1 5 10

<210> 81
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 81
Gly Gly Gly Cys Cys Cys Ala Thr Ala Thr Gly Gly Gly Thr Ala Thr
1 5 10 15

Thr Gly Thr Thr Cys Ala Gly Cys Ala Gly
20 25

<210> 82
<211> 44
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Synthetic

<400> 82
 Gly Gly Gly Cys Cys Gly Gly Cys Gly Cys Cys Thr Gly Ala Gly Cys
 1 5 10 15
 Cys Gly Cys Cys Gly Cys Cys Thr Thr Gly Ala Thr Cys Cys Thr Thr
 20 25 30
 Cys Ala Gly Gly Thr Ala Gly Cys Gly Thr Thr Cys
 35 40

<210> 83
 <211> 44
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 83
 Gly Gly Gly Cys Cys Gly Gly Cys Gly Cys Cys Gly Gly Cys Thr Cys
 1 5 10 15
 Ala Gly Ala Gly Thr Gly Gly Gly Ala Cys Ala Gly Ala Gly Ala Ala
 20 25 30
 Ala Thr Thr Ala Ala Cys Ala Ala Thr Thr Ala Cys
 35 40

<210> 84
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Synthetic

<400> 84
 Gly Gly Gly Cys Cys Gly Ala Ala Thr Thr Cys Thr Thr Ala Ala Ala
 1 5 10 15
 Ala Cys Cys Ala Ala Thr Thr Cys Cys Ala Cys Ala Ala Cys Thr
 20 25 30
 Thr Gly Cys Cys Cys Ala Thr Thr Thr
 35 40